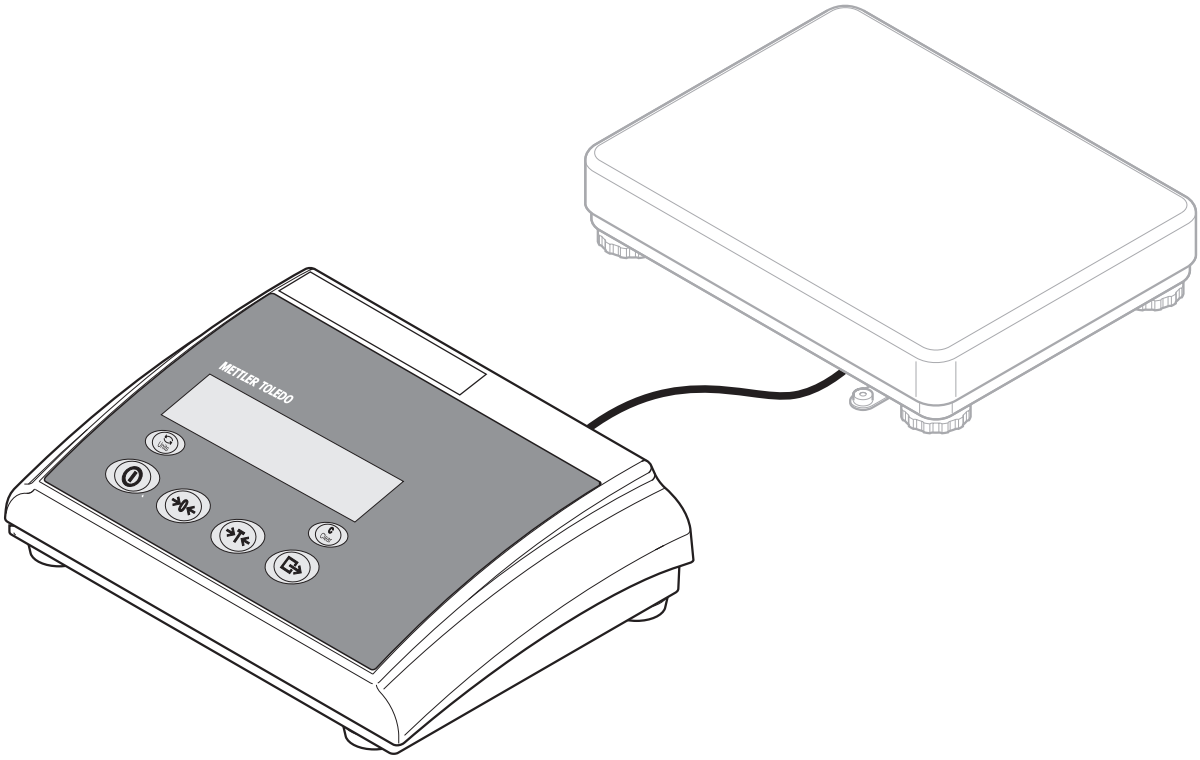
User manual

METTLER TOLEDO

METTLER TOLEDO
Weighing terminal IND425



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1 Introduction

1.1 Safety instructions

CAUTION!

Do not use IND425 in hazardous areas!

Our product range includes special devices for hazardous areas.

CAUTION!

Use only scales with Protection Class IP65, if:

- the scale is used in wet areas
- wet cleaning is necessary
- the scale is used in a dusty environment

Even with Protection Class IP65, the scale must not be used in environments with corrosion risk.

▲ Never flood the scale or immerse it in liquid.

DANGER!

Electric shock hazard!

▲ Always pull out the mains plug before any work on the device.

DANGER!

Electric shock hazard if the mains cable is damaged!

▲ Check the mains cable for damage regularly and replace it immediately if it is damaged.

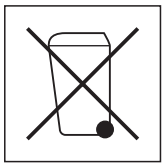
▲ On the rear side of the device, maintain a clearance of at least 3 cm in order to prevent the mains cable bending too much.

CAUTION!

On no account open the device!

The warranty is void if this stipulation is ignored. The device may only be opened by authorized persons.

▲ Call METTLER TOLEDO Service.



Disposal

➜ Observe the valid environmental regulations when disposing of the scale.

If the device has a rechargeable battery:

The battery contains heavy metals and therefore must not be disposed of with normal waste.

➜ Observe the local regulations for disposing of environmentally hazardous materials.

Note **Use with foodstuffs**

Parts coming into contact with foodstuffs have smooth surfaces and are easy to clean. The materials used do not splinter and are free of harmful substances.

With foodstuffs, it is recommended to use the supplied protective cover.

➜ Clean the protective cover regularly and carefully.

➜ Replace damaged or very dirty protective cover immediately.

1.2 Description

METTLER TOLEDO weighing platforms can be connected to the terminal IND425 without any problems.

The power supply is carried out via a built-in power supply device or an external battery.

One of the following options can also be ordered:

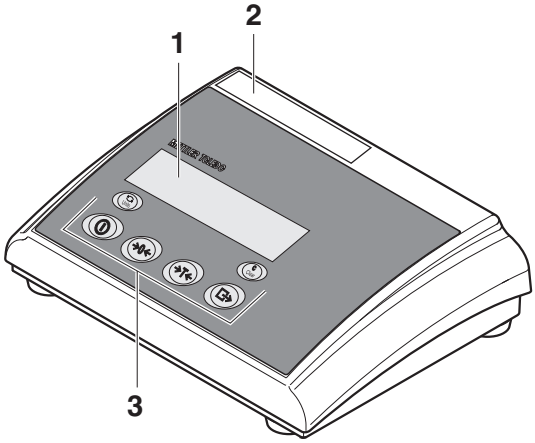
- Additional interface RS232 or RS485
- Ethernet interface
- USB interface
- Digital I/O
- OptionBox for AccuPac

1.2.1 Overview

1 Display

2 Specifications, rating plate

3 Keys

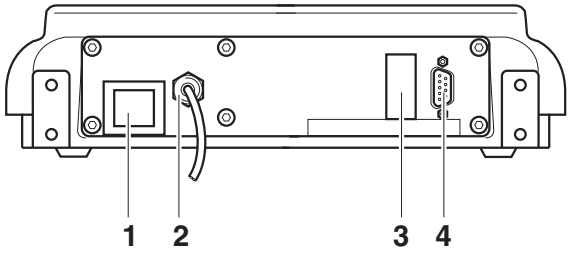


1 Power supply connection

2 Weighing platform connection

3 Optional interface

4 RS232 interface



1.2.2 Display

1 Active interface

2 Weighing range display

3 Battery charge level; only present on scales with a battery

4 Symbol for displaying net values

5 Symbol for dynamic weighing

6 Weight units

7 7-segment display, 7 digits, with decimal point

8 Stability monitor (goes out when a stable weight value is reached)

9 Sign

10 Identification for changed or calculated weight values, e. g. higher resolution, minimum weight not reached

1.2.3 Keypad

Main functions

Key	Function in operating mode	Function in the menu
	Switching device on / off, abort	To the last menu item –End–
	Setting scale to zero	Scrolling back
	Taring scale	Scrolling forward
	Transfer key Long key press: Calling up menu	Activating menu item Accepting selected setting

Additional functions

Key	Function
	Switching weight unit
	Clear key

1.3 Putting into operation

For startup, connect the terminal to an analog METTLER TOLEDO weighing platform (see installation instructions METTLER TOLEDO Terminals IND4.. or call METTLER TOLEDO Service).

1.3.1 Connecting the power supply

CAUTION!

Before connecting the scale to the mains, check whether the voltage value printed on the rating plate corresponds with the local mains voltage.

▲ Never connect the device if the voltage value printed on the rating plate is different to the local mains voltage.

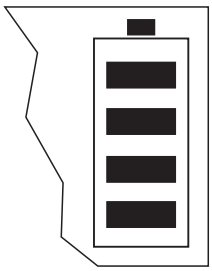
➜ Plug the mains plug into the socket.

After connection, the device performs a self-test. When the zero display appears, the device is ready to weigh.

➜ Calibrate the device in order to obtain the greatest possible precision, see Section 3.3.1.

Note Partially certified scales (scales with first-level certification) must be certified by an authorised body or by the METTLER TOLEDO Service.

➜ Call METTLER TOLEDO Service.



Terminals with AccuPac can work independently from the mains for approximately 30 hours in normal operation. A prerequisite for this is that the background lighting is switched off and that no peripheral devices are connected.

The battery symbol indicates the present charging level of the battery. 1 segment corresponds to approx. 25 % capacity. When the symbol flashes the battery must be charged (min. 4 hours). The charging period is extended if work is continued during charging. The battery is protected against overcharging.

Note The battery's charging capacity can be reduced under continuous mains operation.

➜ To maintain the charging capacity, after a maximum of 4 weeks discharge the battery completely before recharging it.

2 Operation

2.1 Switching on and off

Switching on

➜ Press ⏻.

The scale conducts a display test. When the weight display appears, the scale is ready to weigh.

Switching off

➜ Press ⏻.

Before the display goes out, `-OFF-` appears briefly.

2.2 Zeroing / Zero point correction

Zeroing corrects the influence of slight changes on the load plate.

Manual

1. Unload scale.
2. Press →0←.

   The zero display appears.

Automatic

In the case of scales that cannot be certified, the automatic zero point correction can be deactivated in the menu or the amount can be changed.

As standard, the zero point of the scale is automatically corrected when the scale is unloaded.

2.3 Simple weighing

1. Place weighing sample on scale.
2. Wait until the stability monitor ○ goes out.
3. Read weighing result.

2.4 Weighing with tare

2.4.1 Taring

➜ Place the empty container on the scale and press →T←.

The zero display and the symbol **NET** appear.

The tare weight remains saved until it is cleared.

2.4.2 Clearing the tare

➜ Unload scale and press →T←.

The symbol **NET** goes out, the zero display appears.

or

➜ Press C Clear.

The symbol **NET** goes out, the gross weight appears in the display.

If `A.CL-tr` is activated in the menu, the tare weight is automatically cleared as soon as the scale is unloaded.

2.4.3 Automatic taring

Prerequisite

`A-tArE` is activated in the menu, the symbol **T** flashes in the display.

➜ Place the container or packaging material on the scale.

The packaging weight is automatically saved as the tare weight, the zero display and the symbol **NET** appear.

2.4.4 Chain tare

Prerequisite

The tare function `CHAIn.tr` is activated in the menu.

With this function it is possible to tare several times if, for example, cardboard is placed between individual layers in a container.

1. Place the first container or packaging material on the scale and press →T←.

   The packaging weight is automatically saved as the tare weight, the zero display and the symbol **NET** appear.
2. Weigh the weighing sample and read/print out the result.
3. Place the second container or packaging material on the scale and press →T← again.

   The total weight on the scale is saved as the new tare weight. The zero display appears.
4. Weigh the weighing sample in the second container and read/print the result.
5. Repeat the last two steps for other containers.

2.5 Dynamic weighing

With the dynamic weighing function, it is possible to weigh restless weighing samples such as live animals. If this function is activated, the symbol appears in the display.

With dynamic weighing, the scale calculates the mean value from 56 weighing operations within 4 seconds.

With manual start

Prerequisite

`AVErAGE -> MAnuAL` is selected in the menu.

The weighing sample must be heavier than 5 scale divisions.

1. Place the weighing sample on the scale and wait until it has stabilized.
2. Press to start dynamic weighing.

   During dynamic weighing, horizontal segments appear in the display, and the dynamic result is then displayed with the symbol *****.
3. Unload the scale to be able to start a new dynamic weighing operation.

With automatic start

Prerequisite

`AVErAGE -> AUtO` is selected in the menu.

The weighing sample must be heavier than 5 scale divisions.

1. Place the weighing sample on the scale.

   The scale starts the dynamic weighing automatically.

   During dynamic weighing, horizontal segments appear in the display, and the dynamic result is then displayed with the symbol *****.
2. Unload the scale to be able to perform a new dynamic weighing operation.

2.6 Printing results

If a printer or computer is connected to the scale, the weighing results can be printed out or sent to a computer.

➜ Press .

The display contents are printed out and transferred to the computer. See Section 7.3 for sample protocols.

2.7 Cleaning

CAUTION!

Electric shock hazard!

▲ Before cleaning with a damp cloth, pull out the mains plug to disconnect the unit from the power supply.

Other cleaning information:

- Use damp cloths.
- Do not use any acids, alkalis or strong solvents.
- Do not clean using a high-pressure cleaning unit or under running water.
- Follow all the relevant instructions regarding cleaning intervals and permissible cleaning agents.

3 Settings in the menu

Settings can be changed and functions can be activated in the menu. This enables adaptation to individual weighing requirements.

The menu consists of 6 main blocks containing various submenus on several levels.

3.1 Operating the menu

3.1.1 Calling up the menu and entering the password

The menu differentiates between 2 operating levels: Operator and Supervisor. The Supervisor level can be protected by a password. When the device is delivered, both levels are accessible without a password.

Operator menu

1. Press ⊏→ and keep it pressed until `COdE` appears.
2. Press ⊏→ again.
   The menu item `tErMINL` appears. Only the submenu `dEVICE` is accessible.

Supervisor menu

1. Press ⊏→ and keep it pressed until `COdE` appears.
2. Enter the password and confirm with ⊏→.
   The first menu item `SCALE` appears.

Note No supervisor password has been defined when the device is first delivered. Therefore respond to the password inquiry with ⊏→ when you call up the menu for the first time.

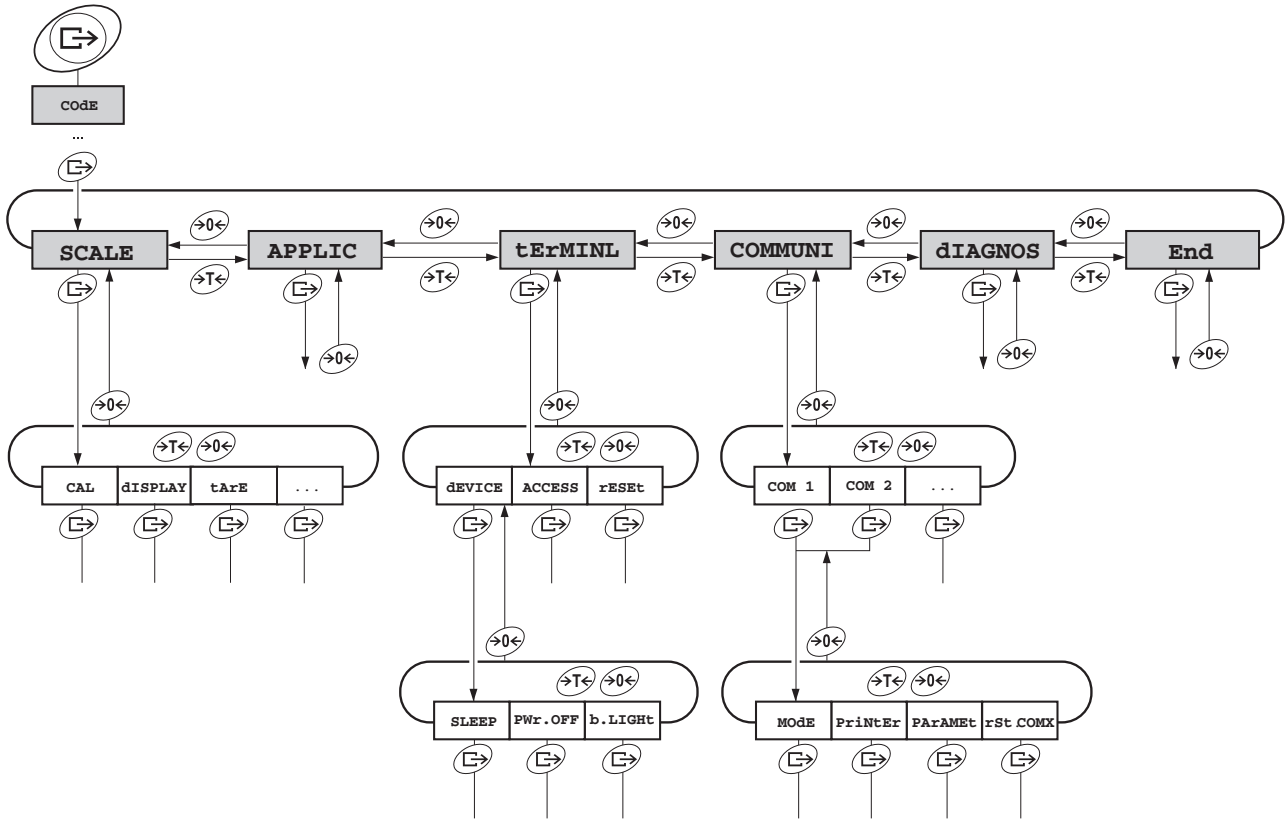
If a password has still not been entered after a few seconds, the scale returns to weighing mode.

Emergency password for Supervisor access to the menu

If a password has been issued for Supervisor access to the menu and you have forgotten it, you can still enter the menu:

➜ Press →0← 3 times and confirm with ⊏→.

3.1.2 Selecting and setting parameters



Scrolling on one level

➜ Scroll forward: Press →T←.

➜ Scroll back: Press →0←.

Activating menu items/ accepting selection

➜ Press ⊡→.

Exiting menu

1. Press ⏻.
   The last menu item END appears.
2. Press ⊡→.
   The inquiry SAVE appears.
3. Confirm inquiry with ⊡→ to save the settings and return to weighing mode.
   -or-

➜ Press →T← to discard changes and return to weighing mode.

3.2 Overview

Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Page
SCALE	CAL					18
	dISPLAY	UNIt1	g, **kg**, oz, lb, t			18
		UNIt2	**g**, kg, oz, lb, t			
		rESOLU				
		UNt.rOLL	ON, **OFF**			
	tArE	A-tArE	ON, **OFF**			18
		ChAIn.tr	**ON**, OFF			
		A.CL-tr	ON, **OFF**			
	ZErO	AZM	OFF; 0.5 d; 1 d; 2 d; 5 d; 10 d			18
	rEStArt	ON/**OFF**				19
	FILtEr	VibrAt	LOW, **MEd**, HIGH,			19
		PrOCESS	**UNIVEr**, dOSING			
		StABILI	FASt, **StAndrd**, PrECISE			
	Min.WEiG	ON/OFF	ON, **OFF**			19
	rESEt	SUrE?				19
APPLIC	AVErAGE	**OFF**, AUtO, MAnuAL				20
	rESEt	SUrE?				20
tERMINL	dEVICE	SLEEP	**OFF**, 1 min, 3 min, 5 min			20
		PWr OFF	**YES**, NO			
		b.LIGHt	ON, **OFF**			
	ACCESS	SUPErVI				21
	rESEt	SUrE?				21
COMMUNI	COM 1/COM 2	MOdE	**Print**			21
			A.Print			
			CONtINU			
			dIALOG			
			CONt.OLd			
			dIAL.OLd			
			dt-b	GrOSS	ON, OFF	
				tArE	ON, OFF	
				nEt	ON, OFF	

Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Page
			dt-G	GrOSS	ON, OFF	
				tArE	ON, OFF	
				nEt	ON, OFF	
			COnt-Wt			
			2nd.dISP			
		PriNtEr	tEmPLat	**StdArd**, tEMPLt1, tEMPLt2		22
			ASCi.Fmt	LINE.FMt	**MULtI** SINGLE	
				LENGtH	1 … 100	
				SEPArAt	, ;…	
				Add LF	0 … 9	
		PArAMEt	bAUd	300 … 38400		22
			PArityY	7 nonE, 8 nonE, 7 odd, 8 odd, **7 EVEN**, 8 EVEN		
			H.SHAKE	NO, **XONXOFF**, nEt 422, nEt 485		
			NEt.Addr	0 … 31		
			ChECSuM	ON, **OFF**		
			Vcc	ON, **OFF**		
		rSt.COMx	SUrE?			22
COMMUNI	OPtION	EtH.NEt	IP.AddrS, SUbNEt, GAtEWAY			22
		USb	USb tESt			22
		diGitAL	IN 1 … 4	**OFF**, ZErO, tArE, Print, CLEAr, Unit		22
			OUT 1 … 4	**OFF**, StAbLE, bEL.Min, AbV.Min, UndErLd, OVErLd, StAr		
	dEF.PrN	tEmPLt1/ tEMPLt2	LINE 1 … LINE 20	**NOt.USEd**, HEAdEr, GrOSS, tArE, nEt, StArLN, CrLF, F FEEd		23
dIAGNOS	tESt SC	ExtErN				24
	KboArd					
	dISPLAY					
	SNr					
	LiSt					
	rESEt.AL	SUrE?				

3.3 Scale settings (SCALE)

3.3.1 CAL – calibration (adjustment)

This menu item is not available for certified scales without internal calibration weight.

CAL	1. Unload scale. 2. Activate menu item `CAL` with (→). The scale determines the zero point. `-0-` appears in the display. The calibration weight to be placed on the scale then flashes in the display. 3. If necessary, change the weight value displayed with (→T←). 4. Place the calibration weight on the scale and confirm with (→). The scale calibrates with the calibration weight loaded. After calibration is completed, `-donE-` appears briefly in the display, and the scale automatically returns to weighing mode.

3.3.2 DISPLAY – weighing unit and display accuracy

UNIt1	Select weighing unit 1: g, kg, oz, lb, t
UNIt2	Select weighing unit 2: g, kg, oz, lb, t
rESOLU	Select readability (resolution), model-dependent
UNt.rOLL	When `UNT.rOLL` is switched on, the weight value can be displayed in all available units with (Units).
Notes	• On certified scales, the weighing units oz and lb are displayed with the symbol *. • On certified scales, resolutions that deviate from the scale definition are displayed without a weighing unit and with the symbol *****. • On dual-range/dual interval scales, resolutions marked with **I<–> 1/2I** are divided up into 2 weighing ranges / intervals, e.g. 2 x 3000 d.

3.3.3 TARE – tare function

A-tArE	Switching on/off automatic taring
CHAIn.tr	Switching on/off chain tare
A.CL-tr	Switching on/off automatic taring with automatic clearing of the tare weight when the load is removed from scale

3.3.4 ZERO – automatic zero update

AZM	On certified scales, this menu item does not appear. Switching on/off automatic zero update and selecting zeroing range. Possible settings: OFF; 0.5 d; 1 d; 2 d; 5 d; 10 d

3.3.5 RESTART – automatic saving of zero point and tare value

ON/OFF	When the Restart function is activated, the last zero point and tare value are saved. After switching off / on or after a power interruption, the device continues to work with the saved zero point and tare value.

3.3.6 FILTER – adaptation to the ambient conditions and the weighing type

VIbrAt	Adaptation to the ambient conditions
LOW	• Very steady and stable environment. The scale works very quickly, but is very sensitive to external influences.
MEd	• Normal environment. The scale operates at medium speed.
HIGH	• Restless environment. The scale works more slowly, but is insensitive to external influences.
PrOCESS	Adaptation to the weighing process
UNIVEr	• Universal setting for all weighing samples and normal weighing goods
dOSING	• Dispensing liquid or powdery weighing samples
StAbILI	Adjusting the weighing speed
FASt	• The scale operates very fast.
StAndrd	• The scale operates at medium speed.
PrECISE	• The scale operates with the greatest possible reproducibility.
	The slower the scale works, the greater the reproducibility of the weighing results.

3.3.7 MIN.WEIG – minimum weight

This menu item appears only if the service technician has saved a minimum weight.

ON/OFF	Switching minimum weight function on/off If the weight on the scale falls below the stored minimum weight, an * appears on the display in front of the weight indicator.

3.3.8 RESET – resetting scale settings to factory settings

SUrE?	Confirmation inquiry • Reset the scale settings to factory settings with • Do not reset scale settings with

3.4 Application settings (APPLICATION)

3.4.1 AVERAGE – determining the average weight for an unstable load

OFF	Calculating average weight switched off
AUtO	Calculating average weight with automatic start of the weighing cycle
MAnuAL	Calculating average weight with manual start of the weighing cycle via

3.4.2 RESET – resetting application settings to factory settings

SUrE?	Confirmation inquiry • Reset the application settings to factory settings with • Do not reset the application settings with

3.5 Terminal settings (TERMINAL)

3.5.1 DEVICE – Sleep mode, energy-saving mode and display backlighting

SLEEP	This menu item only appears on devices in mains operation. When SLEEP is activated, the scale switches off display and backlighting after the time period set when not in use. The display and backlighting are switched on again at the press of a key or if the weight changes. Possible settings: OFF, 1 min, 3 min, 5 min
PWr OFF	This menu item only appears on devices in battery operation. When PWr OFF is activated, the device switches itself off automatically after approx. 3 minutes when not in use.
b.LIGHt	Switching the display backlighting on/off. On scales with a battery, the background lighting switches itself off automatically if there has been no activity on the scale for 5 seconds.
Note	This menu item is accessible without a Supervisor password.

3.5.2 ACCESS – password for Supervisor menu access

SUPErVI	Password entry for Supervisor menu access
ENtER.C	Request to enter password ➜ Enter the password and confirm with ⇨
rEtYPE.C	Request to repeat the password entry ➜ Enter the password again and confirm with ⇨
Notes	• The password can consist of up to 4 characters. • The key ⇨ must not be part of the password. It is required for confirming the password. • The key →0← may only be used in combination with another key. • If you enter an impermissible code or make a typing error in the repetition, COdE.Err. appears in the display.

3.5.3 RESET – resetting terminal settings to the factory settings

SUrE?	Confirmation inquiry • Reset terminal settings to the factory settings with ⇨ • Do not reset the terminal settings with →T←

3.6 Configuring interfaces (COMMUNICATION)

3.6.1 COM1/COM2 -> MODE – operating mode of the serial interface

Print	Manual data output to the printer with ⇨
A.Print	Automatic output of stable results to the printer (e. g. for series weighing operations)
CONtINU	Ongoing output of all weight values via the interface
dIALOG	Bi-directional communication via MT-SICS commands, control of the scale via PC
CONt.OLd	As per CONtINU, see above, but with 2 fixed blanks in front of the unit (compatible with Spider 1/2/3)
dIAL.OLd	As per dIALOG, see above, but with 2 fixed blanks in front of the unit (compatible with Spider 1/2/3)
dt-b	DigiTOL-compatible format.
GROSS	• Transfer of the gross weight, identified with "G"
tArE	• Transfer of the tare weight
nEt	• Transfer of the net weight
dt-G	As per dt-b, see above, gross weight identified with "G"
COnt-Wt	TOLEDO Continuous mode
2nd.dISP	For connecting a second display (automatically activates the 5-V voltage supply at Pin 9)

3.6.2 COM1/COM2 -> PRINTER – settings for protocol printout

This menu item only appears if the mode "Print" or "A.Print" is selected.

tEmPLat	Selecting protocol printout
StdArd	• Standard printout
tEmPLt1	• Printout in accordance with Template 1
tEmPLt2	• Printout in accordance with Template 2
ASCi.FmtT	Selecting formats for the protocol printout
LINE.Fmt	• Line format: MULtI (multi-line) or SINGLE (single-line)
LENGtH	• Line length: 0 ... 100 characters, appears only with line format MULtI
SEPArAt	• Separator: , ; . / \ _ and space; appears only with line format SINGLE
Add LF	• Line feed: 0 ... 9

3.6.3 COM1/COM2 -> PARAMET – communication parameter

bAUd	Selecting baud rate: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400 baud
PAritY	Selecting parity: 7 none, 8 none, 7 odd, 8 odd, 7 even, 8 even
H.SHAKE	Selecting Handshake: NO, XONXOFF, nEt422, nEt485 (network operation as per RS485 standard via the optional RS422/RS485 interface, only for COM1)
NET.Addr	Assigning network address: 0 ... 31, only for NET 485
ChECSuM	Activating checksum byte (appears only in TOLEDO Continuous mode)
Vcc	Switching 5V voltage, e.g. for a bar code reader, on / off

3.6.4 COM1/COM2 -> RESET COM1/RESET COM2 – resetting serial interface to factory settings

SUrE?	Confirmation inquiry • Reset interface settings to factory settings with • Do not reset the interface settings with

3.6.5 OPTION – configuring options

If no option is installed or is not yet configured, N.A. appears in the display.

EtH.NEt	Configuration of the Ethernet interface
IP.AddrS	• Enter IP address
SUBNEt	• Enter Subnet address
GAtEWAY	• Enter Gateway address
USb	Configuration of the USB interface
USb TEST	• Test of the USB interface. After the test has been passed, rEAdY appears in the display.

diGitAL	Configuration of the digital inputs/outputs
IN 1 ... 4	Configuring inputs 1 ... 4
OFF	• Input not assigned
ZErO	• Key →0←
tArE	• Key →T←
PriNt	• Key
CLEAr	• Key C Clear
UNIt	• Key Units
OUT 1 ... 4	• Configuring outputs 1 ... 4
OFF	• Output not assigned
StAbLE	• Stable weight value
bEL.MIN	• Minimum weight not reached
AbV.MIN	• Minimum weight reached or exceeded
UNdErLd	• Insufficient load
OVErLd	• Overload
StAr	• Changed/calculated value

3.6.6 DEF.PRN – configuring templates

tEMPLt1/tEMPLt2	Selecting Template 1 or Template 2
LINE 1 ... 20	Select line
NOt.USEd	• Line not used
HEAdEr	• Line as header. The contents of the header must be defined via an interface command, see Section 4.1.
GROSS	• Gross weight
tArE	• Tare weight
nEt	• Net weight
StARLN	• Line with ***
CrLF	• Line feed (blank line)
F FEEd	• Page feed

3.7 Diagnosis and printing out of the menu settings (DIAGNOS)

tESt SC External	Testing scale with external calibration weight 1. The scale checks the zero point. –0– appears in the display. The test weight flashes in the display. 2. If necessary, change the weight value displayed with →T←. 3. Put the calibration weight on the scale and confirm with ⊡→. 4. The scale checks the calibration weight put on them. 5. After the test is completed, the deviation from the last calibration briefly appears in the display, ideally *d=0.0g, after which the scale changes to the next menu item KboArd.
KboArd PUSH 1 ... 6	Keyboard test • Press the keys ⏻ →0← →T← ⊡→ Units C Clear in order. If the key works, the scale changes to the next key. **Note** You cannot abort the keyboard test! If you have selected the menu item KboArd, you must press all keys.
dISPLAY	Display test: The scale displays all functioning segments
SNr	Display of the serial number
LiSt	Printout of a list of all menu settings
rESEt.AL SUrE?	Resetting all menu settings to the factory settings Confirmation inquiry • Reset all menu settings to the factory settings with ⊡→ • Do not reset the menu settings with →T←

4 Interface description

4.1 SICS interface commands

The terminal IND425 supports the command set MT-SICS (METTLER TOLEDO **S**tandard **I**nterface **C**ommand **S**et). With SICS commands, it is possible to configure, query and operate the terminal from a PC. SICS commands are divided up into various levels.

For further information about the MT-SICS commands set, see MT-SICS Manual (Order No. 22 011 459) or contact METTLER TOLEDO Customer Service.

4.1.1 Available SICS commands

	Command	**Meaning**
LEVEL 0	@	Reset the scale
	I0	Inquiry of all available SICS commands
	I1	Inquiry of SICS level and SICS versions
	I2	Inquiry of scale data
	I3	Inquiry of scale software version
	I4	Inquiry of serial number
	S	Send stable weight value
	SI	Send weight value immediately
	SIR	Send weight value repeatedly
	Z	Zero the scale
	ZI	Zero immediately
LEVEL 1	D	Write text into display
	DW	Weight display
	K	Keyboard check
	SR	Send and repeat stable weight value
	T	Tare
	TA	Tare value
	TAC	Clear tare
	TI	Tare immediately
LEVEL 2	C2	Calibrate with the external calibration weight
	C3	Calibrate with the internal calibration weight
	I10	Inquire or set scale ID
	I11	Inquiry of scale type
	P100	Print out on the printer

	Command	Meaning
	P101	Print out stable weight value
	P102	Print out current weight value immediately
	PWR	Power On/Off
	SIRU	Send weight value in the current unit immediately and repeat
	SIU	Send weight value in the current unit immediately
	SNR	Send stable weight value and repeat after every weight change
	SNRU	Send stable weight value in the current unit and repeat after every weight change
	SRU	Send weight value in the current unit and repeat
	ST	After pressing the Transfer key, send the stable weight value
	SU	Send stable weight value in the current unit
	TST2	Start test function with external weight
	TST3	Start test function with internal weight
LEVEL SPECIAL	CLR	Clear
	I31	Header for the printout
	ICP	Send configuration of the printout
	LST	Send menu settings
	M01	Weighing mode
	M02	Stability setting
	M03	Autozero function
	M19	Send calibration weight
	M21	Inquire/set weight unit
	P	Print text
	P130	Weight value, unit and price
	PRN	Print out at every printer interface
	RST	Restart
	SFIR	Send weight value immediately and repeat quickly
	SIH	Send weight value immediately in high resolution
	SWU	Switch weight unit
	SX	Send stable data record
	SXI	Send data record immediately
	SXIR	Send data record immediately and repeat
	U	Switch weight unit

4.1.2 Requirements for communication between scale and PC

- The scale must be connected to the RS232, RS485, USB or Ethernet interface of a PC with a suitable cable.
- The interface of the scale must be set to "Dialog" mode, see Section 3.6.1.
- A terminal progam must be available on the PC, e.g. HyperTerminal.
- The communication parameters baud rate and parity must be set in the terminal program and on the scale to the same values, see Section 3.6.3.

4.1.3 Notes on network operation via the optional interface RS422/485

Up to 32 scales can be networked with the optional RS422/485 interface. In network operation, the scales must be addressed from the computer before commands can be sent and weighing results received.

Description of the steps	Host	Direction	Scale
1. Host addresses the scale, e.g. with the address 3A hex.	<ESC> 3A	——>	
2. Host sends a SICS command, e.g. SI	SI <CRLF>	——>	
3. The scale confirms receipt of the command and sends the address back		<——	<ESC> 3A
4. The scale responds to the command and returns control of the bus to the host		<——	S_S____45.02_kg <CRLF>

4.2 TOLEDO Continuous mode

4.2.1 TOLEDO Continuous commands

The scale supports the following input commands in TOLEDO Continuous mode:

Command	Meaning
P <CR><LF>	Print out the current result
T <CR><LF>	Tare the scale
Z <CR><LF>	Zero the display
C <CR><LF>	Clear the current value
Tx.xxx <CR><LF>	Define tare

4.2.2 Output format in TOLEDO Continuous mode

Weight values are always sent in the following format in TOLEDO Continuous mode:

	Status			**Field 1**						**Field 2**							
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
STX	SWA	SWB	SWC	MSD	–	–	–	–	LSD	MSD	–	–	–	–	LSD	CR	CHK

Field 1	6 digits for the weight value that is sent without a decimal point and unit
Field 2	6 digits for the tare weight that is sent without a decimal point and unit
STX	ASCII characters 02 hex, characters for "start of text"
SWA, SWB, SWC	Status words A, B, C, see below
MSD	Most significant digit
LSD	Least significant digit
CR	Carriage Return, ASCII characters 0D hex
CHK	Checksum (2-part complement of the binary sum of the 7 lower bits of all previously sent characters, incl. STX and CR)

Status word A								
		Status Bit						
Function	**Selection**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Decimal position	X00	0	1			0	0	0
	X0					0	0	1
	X					0	1	0
	0.X					0	1	1
	0.0X					1	0	0
	0.00X					1	0	1
	0.000X					1	1	0
	0.0000X					1	1	1
Numerical increment	X1			0	1			
	X2			1	0			
	X5			1	1			

Status word B	
Function / value	**Bit**
Gross / net: Net = 1	0
Sign: Negative = 1	1
Overload = 1	2
Movement = 1	3
lb/kg: kg = 1	4
1	5
Powerup = 1	6

Status word C	
Function / value	**Bit**
0	0
0	1
0	2
Print request = 1	3
Extended = 1	4
1	5
Manual taring, only kg = 1	6

5 Event and error messages

Error	Cause	Remedy
Display Dark	• Back lighting set too dark	➜ Set back lighting (`b.LIGHt`) brighter
	• No mains voltage	➜ Check mains
	• Unit switched off	➜ Switch on unit
	• Mains cable not plugged in	➜ Plug in mains plug
	• Brief fault	➜ Switch device off and back on again
Insufficient load `L - - - - J`	• Load plate not on the scale • Weighing range not reached	➜ Place load plate on the scale ➜ Set to zero
Overload `r - - - - 7`	• Weighing range exceeded	➜ Unload scale ➜ Reduce preload
`- - - - - -`	• Result not yet stable	➜ If necessary adjust vibration adapter or weigh dynamically
`- - no - -`	• Function not permissible	➜ Unload scale and set to zero
`r - no - 7` `L - no - J`	• Zeroing not possible with overload or insufficient load	➜ Unload scale
`Err 6`	• No calibration	➜ Unplug the mains plug then plug it back in; switch unit off and then back on in battery mode ➜ Calibrate scale ➜ Call METTLER TOLEDO Service
`Err 17`	• Printout not yet ended	➜ End printout ➜ Repeat required action
`Err 18`	• Switching the weighing unit impermissible during dynamic weighing	➜ End dynamic weighing ➜ Switch weighing unit
`Err 53`	• EAROM checksum error	➜ Unplug the mains plug then plug it back in; switch unit off and then back on in battery mode ➜ Call METTLER TOLEDO Service

Error	Cause	Remedy
Weight display unstable	• Restless installation location	➜ Adjust vibration adapter
	• Draft	➜ Avoid drafts
	• Restless weighing sample	➜ Dynamic weighing
	• Contact between weighing pan and/or weighing sample and surroundings	➜ Remedy contact
	• Mains fault	➜ Check mains
Incorrect weight display	• Incorrect zeroing	➜ Unload scale, set to zero and repeat weighing operation
	• Incorrect tare value	➜ Clear tare
	• Contact between weighing pan and/or weighing sample and surroundings	➜ Remedy contact
	• Scale tilted	➜ Level scale

6 Technical data and accessories

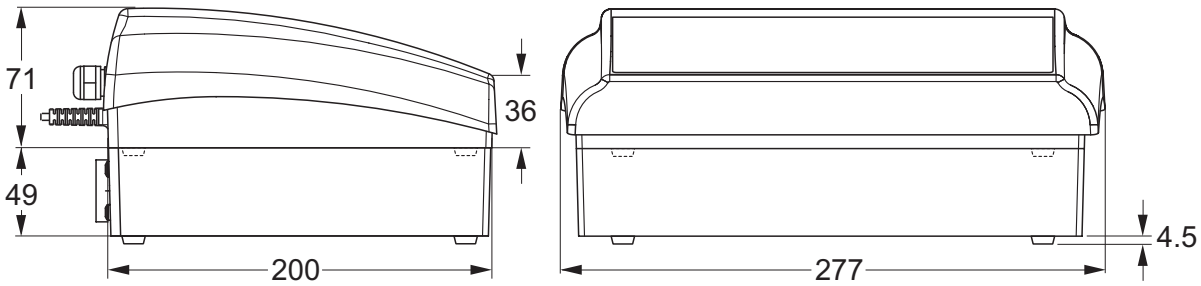
6.1 Technical data

6.1.1 General data

IND425	
Applications	• Weighing • Dynamic weighing
Settings	• Resolution selectable • Weighing unit selectable: g, kg, oz, lb, t • Taring function: manual, automatic, chain tare • Automatic zero point correction when the scale is switched on and during operation • Filter for adapting to the ambient conditions (vibration adapter) • Filter for adapting to the weighing type, e.g. dispensing (weighing process adapter) • Switch-off function, sleep mode for mains-operated devices, energy-saving mode for battery operation • Display lighting
Display	• LCD (liquid crystal display), digits 16 mm high, with back lighting
Keypad	• Pressure point membrane keypad • Scratch-proof labeling
Housing	• Diecast aluminum housing • Dimensions, see Page 33
Protection Class (IEC 529, DIN 40050, EN60529)	• IP65 (not with Ethernet interface)
Mains connection	Direct connection to the mains (MAINS supply voltage fluctuations up to ±10% of the nominal voltage): • 230 V, 50 Hz, 70 mA • 240 V, 50 Hz, 70 mA • 120 V, 60 Hz, 90 mA • 100 V, 50/60 Hz, 90 mA For battery operation: • Connection via mains adapter: 90 – 264 V, 47 – 63 Hz, 300 mA • Infeed on the unit: 24 V, 1.3 A

IND425		
Battery operation	If the voltage supply is interrupted, the unit automatically switches over to battery operation	
Ambient conditions	• Use	Indoor use only
	• Altitude	up to 2000 m
	• Temperature	–10 .. +40 °C / 14 .. 104 °F
	• Overvoltage category	II
	• Contamination level	2
	• Relative humidity	Maximum relative humidity 80 % for temperatures up to 31 °C / 88 °F, decreasing linearly to 50 % relative humidity at 40 °C / 104 °F
Interfaces	• 1 RS232 interface integrated • 1 other optional interface possible	

6.1.2 Dimensions



Dimensions in mm

6.1.3 Net weights

	without battery	**with OptionPac (incl. battery)**
IND4..	2.4 kg	4.4 kg

6.1.4 Interface connections

The terminal can be fitted with a maximum of 2 interfaces. The following combinations are possible:

COM1	COM2	Note
RS232	–	
RS232	RS232	
RS485	RS232	COM1 can be optionally operated as RS422 or RS485
RS232	Ethernet	
RS232	USB	
RS232	Digital I/O	

6.1.5 Assignment of the interface connections

Pin	RS232 (COM1/COM2)	RS422 (4-wire, COM1)	RS485 (2-wire, COM1)	Digital I/O (COM2)
1	–	–	–	GND
2	TxD1/2	TxD1–	TxD1–/RxD1–	OUT0
3	RxD1/2	RxD1–	–	OUT1
4	–	–	–	OUT2
5	GND	GND	GND	OUT3
6	–	–	–	IN0
7	–	TxD1+	TxD1+/RxD1+	IN1
8	–	RxD1+	–	IN2
9	VCC	VCC	VCC	IN3

6.2 Accessories

Designation	Order number
Protective cover for IND4..	21 255 045
Wallmount for IND4..	22 011 471
Second display	21 302 875
Printer Sprinter 1 Euro version	21 253 399
Printer Sprinter 1 UK version	21 253 745
RS232 cable for printer Sprinter 1, 1.8 m long	21 253 677
RS232 cable for second scale, 1.8 m long	21 252 588
RS232 cable for PC, 1.8 m long	00 410 024

7 Appendix

7.1 Safety checks

The terminal IND425 has been tested by accredited inspection bodies. It has passed the safety checks listed below and carries the relevant test symbols. Production is subject to production monitoring by the inspection offices.

Country	**Test symbol**	**Standard**
Canada USA	C US	CAN/CSA-C22.2 No. 1010.1-92 UL Std. No. 61010A-1
Other countries	**CB Scheme** (no identification)	IEC/EN61010-1:2001

7.2 Table of Geo Values

For weighing instruments verified at the manufacturer's, the geo value indicates the country or geographical zone for which the instrument is verified. The geo value set in the instrument (e.g."Geo 18") appears briefly after switch-on or is specified on a label.

Table **GEO VALUES 3000e** shows the geo values for European countries.

Table **GEO VALUES 6000e/7500e** shows the geo values for different gravitation zones.

7.2.1 GEO VALUES 3000e, OIML Class III (European Countries)

Geographical latitude	**Geo value**	**Country**
46°22' – 49°01'	18	Austria
49°30' – 51°30'	21	Belgium
41°41' – 44°13'	16	Bulgaria
42°24' – 46°32'	18	Croatia
48°34' – 51°03'	20	Czechia
54°34' – 57°45'	23	Denmark
57°30' – 59°40'	24	Estonia
59°48' – 64°00' 64°00' – 70°05'	25* 26	Finland
41°20' – 45°00' 45°00' – 51°00'	17 19*	France
47°00' – 55°00'	20	Germany

Geographical latitude	Geo value	Country
34°48' – 41°45'	15	Greece
45°45' – 48°35'	19	Hungary
63°17' – 67°09'	26	Iceland
51°05' – 55°05'	22	Ireland
35°47' – 47°05'	17	Italy
55°30' – 58°04'	23	Latvia
47°03' – 47°14'	18	Liechtenstein
53°54' – 56°24'	22	Lithuiania
49°27' – 50°11'	20	Luxemburg
50°46' – 53°32'	21	Netherlands
57°57' – 64°00' 64°00' – 71°11'	24* 26	Norway
49°00' – 54°30'	21	Poland
36°58' – 42°10'	15	Portugal
43°37' – 48°15'	18	Romania
47°44' – 49°46'	19	Slovakia
45°26' – 46°35'	18	Slovenia
36°00' – 43°47'	15	Spain
55°20' – 62°00' 62°00' – 69°04'	24* 26	Sweden
45°49' – 47°49'	18	Switzerland
35°51' – 42°06'	16	Turkey
49°00' – 55°00' 55°00' – 62°00'	21* 23	United Kingdom

* factory setting

7.2.2 GEO VALUES 6000e/7500e OIML Class III (Height ≤1000 m)

Geograhical latitude	Geo value
00°00' – 12°44'	5
05°46' – 17°10'	6
12°44' – 20°45'	7
17°10' – 23°54'	8
20°45' – 26°45'	9
23°54' – 29°25'	10
26°45' – 31°56'	11
29°25' – 34°21'	12
31°56' – 36°41'	13
34°21' – 38°58'	14
36°41' – 41°12'	15
38°58' – 43°26'	16
41°12' – 45°38'	17
43°26' – 47°51'	18
45°38' – 50°06'	19
47°51' – 52°22'	20
50°06' – 54°41'	21
52°22' – 57°04'	22
54°41' – 59°32'	23
57°04' – 62°09'	24
59°32' – 64°55'	25
62°09' – 67°57'	26
64°55' – 71°21'	27
67°57' – 75°24'	28
71°21' – 80°56'	29
75°24' – 90°00'	30

7.3 Sample protocols

Weighing with tare

```
G          0.1085 kg
T          0.0145 kg
N          0.0940 kg
```

Dynamic weighing

```
Dyn WT     43.52 kg
T           3.78 kg
```

Printout with header

```
METTLER TOLEDO
www.mt.com


G          0.1085 kg
T          0.0145 kg
N          0.0940 kg
```

G = Gross weight

N = Net weight

T = Tare

Dyn WT = dynamically determined weight

Protocol of the scale settings (menu point `List`, see page 24)

```
SOFTWARE VER 7-0-1.01b

SCALE
-------------
METROLO     :NO APPr
SNR         :0000000
Scale Build
 SCAL.TYP   :2MULT.RN
 BAS.UNIT   :kg
 SCL.CAP1   :1.5000 kg
 RESOL.1    :0.0005 kg
 SCL.CAP2   :3.000 kg
 RESOL.2    :0.001 kg
GEO          :19
DISPLAY
 UNIt1      :kg
 UNIt2      :g
 RESOLU     :0.0005 kg
 UNt.rOLL   :ON
tArE
 A-TArE     :OFF
 CHAIn.tr   :OFF
 A.CL-tr    :OFF
 PB.TArE    :ON
ZERO
 Z-CAPT     :-2 18
 AZM        :2 d
RESTART     :ON
FILTER
 VIBRAT     :MED
 PROCESS    :UNIVEr
 StABILI    :FASt
Min.WEiG
 SEt.VAL    :0.200 kg
 ONOFF      :OFF

APPLICATION
-------------
DYNAMIC     :OFF

TERMINAL
-------------
DEVICE
 SLEEP      :OFF
 B.LIGHt    :OFF
```

```
COMMUNICATION
-------------
COM 1
 MODE       1:Print
 PriNtEr
  tEmPLat   1:StdArd
  ASCi.Fmt
   LINE.FMT1:MULTI
   LENGtH    1:0
   ADD LF    1:0
 PARAMET
  BAUD      1:9600
  PAriTY    1:8 nonE
  H.SHAKE   1:XONXOFF
  ChECSUM   1:OFF
  Vcc       1:OFF
COM 2
 MODE       2:DIALOG
 PARAMET
  BAUD      2:9600
  PAriTY    2:8 nonE
  H.SHAKE   2:XONXOFF
  ChECSUM   2:OFF
  Vcc       2:OFF
OPTION
 EtH.NEt    :N.A.
 USB        :N.A.
DEF.PrN
 tEmPLt1
  LINE 1    :HEAdEr
  LINE 2    :CrLF
  LINE 3    :GROSS
  LINE 4    :tArE
  LINE 5    :nEt
  LINE 6    :F FEEd
  LINE 7    :STARLN
  LINE 8    :CrLF
 tEmPLt2
```

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